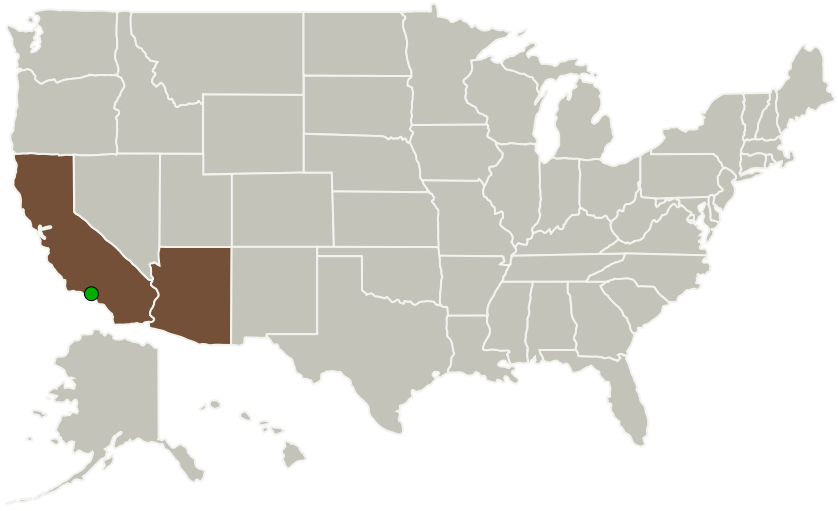
High Temperature Acid Resistant Balloon, Phase I

Completed Technology Project (2011 - 2011)

Project Introduction

A Venus mission will require a vehicle for atmospheric exploration and to transport the samples from the Venus surface to the top of the atmosphere. For this purpose it is reasonable (due to the high density of the Venus atmosphere) to use inflatable balloons, which occupy minimal space in the folded position and possess buoyancy upon being inflated. The Venus atmosphere contains hot (up to 460oC) clouds of sulfuric acid. The only kinds of material for an inflatable to withstand such high temperatures are metals. A sequence of operations is proposed to build balloons of different shapes with diffusion bonding of stainless steels or other alloys, which are most resistant against hot 85% sulfuric acid. However, even these materials possess a many times greater corrosion rate than that satisfying the current topic requirements on the balloon life time and areal density. In order to provide the required corrosion resistance, the fully bonded balloon will be coated with a thin layer of gold or tantalum by a PVD process or with gold by electroplating so that the entire laminate would possess an areal density of below 1000 g/m3. Building a seamless bellows by PVD is a backup option.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
ATS-MER, LLC	Lead Organization	Industry	Tucson, Arizona
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations	
Arizona	California

Project Transitions

March 2011: Project Start

September 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/138222)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

ATS-MER, LLC

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

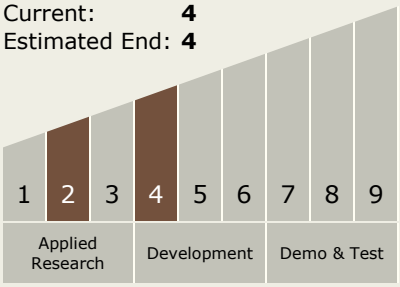
Carlos Torrez

Principal Investigator:

Eugene Dyadko

Technology Maturity (TRL)

Start: **2**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.3 In-Situ Instruments and Sensors
    - TX08.3.6 Extreme Environments Related to Critical System Health Management

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System